Docket No.: 0152-0705PUS1
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Mutsuhiro MARUYAMA et al.

Application No.: Not Yet Assigned | Confirmation No.: N/A

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For: COPPER OXIDE ULTRAFINE PARTICLES | Examiner: Not Yet Assigned

LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

The PTO is requested to use the amended sheets/claims attached hereto (which correspond to Article 19 amendments or to claims attached to the International Preliminary Examination Report (Article 34)) during prosecution of the above-identified national phase PCT application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §1.16 or 1.14; particularly, extension of time fees.

Dated: June 2, 2005

Respectfully submitted,

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Attachment(s)

"AMENDMENT UNDER PCT ARTICLE 34"
being 14 pages numbered 1–14,

AMENDMENT UNDER PCT ARTICLE 34

In the claims

Claims 1-22, 30 and 35-37 have been amended as follows and claims 23-29 have been cancelled.

1. (Amended) A soft agglomerate of cuprous oxide ultrafine particles which has an average primary particle diameter of not more than 100 nm and an average secondary particle diameter of not less than 0.2 μm.

2. (Amended) A soft agglomerate of cuprous oxide ultrafine particles according to claim 1 which has an average primary particle diameter of not more than 25 nm.

3. (Amended) A soft agglomerate of cuprous oxide ultrafine particles according to claim 1 which has an average primary particle diameter of not more than 10 nm.

4. (Amended) A soft agglomerate of cuprous oxide ultrafine particles according to any one of claims 1-3 which does not have a surfactant or a bulky organic compound on the particle surface.

5. (Amended) A method for producing a soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises simultaneously carrying out production of cuprous oxide ultrafine particles and formation of a soft agglomerate of the

ultrafine particles by producing the cuprous oxide ultrafine particles in a bad dispersion medium.

6. (Amended) A method for producing a soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises producing cuprous oxide ultrafine particles in a good dispersion medium and then forming a soft agglomerate of the cuprous oxide ultrafine particles by giving an agglomerating force between the cuprous oxide ultrafine particles.

7. (Amended) A method for producing a soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises producing cuprous oxide ultrafine particles in a good dispersion medium and simultaneously therewith forming a soft agglomerate of the cuprous oxide ultrafine particles by giving an agglomerating force between the cuprous oxide ultrafine particles.

8. (Amended) A method for producing a dispersion of cuprous oxide ultrafine particles which comprises a first step of synthesizing cuprous oxide ultrafine particles having an average primary particle diameter of not more than 100 nm in a first solvent and simultaneously therewith obtaining a soft agglomerate of cuprous oxide ultrafine particles having a secondary particle diameter of not less than 0.2 μm, a second step of separating the soft agglomerate obtained at the first step from the first solvent, and a third step of redispersing the soft agglomerate separated at the

second step in a second solvent to obtain a dispersion of cuprous oxide ultrafine particles.

9. (Amended) A method for producing a dispersion of cuprous oxide ultrafine particles according to claim 8, wherein the dispersion of cuprous oxide ultrafine particles obtained at the third step is in the colloidal state and the cuprous oxide ultrafine particles are suspended in the dispersion.

10. (Amended) A method for producing a dispersion of cuprous oxide ultrafine particles according to claim 9, wherein the cuprous oxide ultrafine particles have an average secondary particle diameter of less than 200 nm in the dispersion of cuprous oxide ultrafine particles which is in the colloidal state.

11. (Amended) A method for producing a dispersion of cuprous oxide ultrafine particles according to any one of claims 8-10, wherein the second solvent contains a dispersing agent for the cuprous oxide ultrafine particles.

12. (Amended) A method for producing a dispersion of cuprous oxide ultrafine particles according to claim 11, wherein the dispersing agent is a polyhydric alcohol.

13. (Amended) A method for producing a dispersion of cuprous oxide ultrafine particles according to claim 12, wherein the polyhydric alcohol has a carbon number of not more than 10.

14. (Amended) A dispersion of cuprous oxide ultrafine particles which is obtained by the method of any one of claims 8-13.

15. (Amended) A dispersion of cuprous oxide ultrafine particles according to claim 14 which contains 0.01-50% by weight of a reducing agent capable of reducing the cuprous oxide ultrafine particles in the dispersion.

16. (Amended) Cuprous oxide ultrafine particles which have an average primary particle diameter of not more than 100 nm and an average secondary particle diameter of less than 0.2 μm.

17. (Amended) Cuprous oxide ultrafine particles according to claim 15 having an average primary particle diameter of not more than 25 nm.

18. (Amended) Cuprous oxide ultrafine particles according to claim 15 having an average primary particle diameter of not more than 10 nm.

19. (Amended) Cuprous oxide ultrafine particles according to any one of claims 16-18 which do not have a surfactant or a bulky organic compound on the surface of the particles.

20. (Amended) A method for producing cuprous oxide ultrafine particles of any one of claims 16-19 which comprises obtaining cuprous oxide ultrafine particles by dispersing the soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4.

21. (Amended) A colloidal dispersion of cuprous

oxide ultrafine particles which contains cuprous oxide ultrafine particles of any one of claims 16-19, the particles being suspended in the dispersion medium.

22. (Amended) A colloidal dispersion of cuprous oxide ultrafine particles according to claim 21, wherein the total weight of the cuprous oxide ultrafine particles is not less than 10% by weight based on the total weight of the dispersion.

23. (Cancelled)

24. (Cancelled)

25. (Cancelled)

26. (Cancelled)

27. (Cancelled)

28. (Cancelled)

29. (Cancelled)

30. (Amended) A method for producing a soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises reducing a cuprous carboxyl compound with hydrazine and/or a hydrazine derivative in an amount of 0.4-5.0 moles based on 1 mole of the cuprous carboxyl compound in an aqueous solution containing not less than 10% by weight of water to produce cuprous oxide ultrafine particles.

31. A method for producing a soft agglomerate of cuprous oxide ultrafine particles according to claim 30, wherein the solution contains at least one organic compound selected from the group consisting of alcohol compounds, ether compounds, ester compounds and amide

compounds.

32. A method for producing a soft agglomerate of cuprous oxide ultrafine particles according to claim 30 or 31 which further comprises adding a basic compound for reducing the copper carboxyl compound with hydrazine and/or a hydrazine derivative.

33. A method for producing a soft agglomerate of cuprous oxide ultrafine particles according to any one of claims 30-32, wherein the copper carboxyl compound is copper acetate.

34. A method for producing a soft agglomerate of cuprous oxide ultrafine particles according to any one of claims 30-33, wherein hydrazine and/or a hydrazine derivative are dissolved in the solution at a concentration higher than 20% by weight and the solution is added to the reaction solution.

35. (Amended) A method for producing a soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises obtaining a colloidal dispersion of cuprous oxide ultrafine particles by heating and reducing at least one copper compound selected from the group consisting of a copper carboxyl compound, a copper alkoxy compound and copper diketonate compound at a temperature of not lower than 160°C in diethylene glycol and forming a soft agglomerate of cuprous oxide ultrafine particles by further heating the colloidal dispersion.

36. (Amended) A method for producing a soft

agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises obtaining a colloidal dispersion of cuprous oxide ultrafine particles by heating and reducing at least one copper compound selected from the group consisting of a copper carboxyl compound, a copper alkoxy compound and copper diketonate compound at a temperature of not lower than 160°C in diethylene glycol and then adding to the dispersion an agglomerating agent for cuprous oxide ultrafine particles.

37. (Amended) A method for producing a soft agglomerate of cuprous oxide ultrafine particles of any one of claims 1-4 which comprises heating and reducing at least one copper compound selected from the group consisting of a copper carboxyl compound, a copper alkoxy compound and copper diketonate compound at a temperature of not lower than 160°C in diethylene glycol and simultaneously adding to the diethylene glycol an agglomerating agent for cuprous oxide ultrafine particles, which is soluble in diethylene glycol at the reaction temperature.

38. A method for producing a soft agglomerate of cuprous oxide ultrafine particles according to claim 36 or 37, wherein the agglomerating agent is at least one compound selected from the group consisting of monoalcohol compounds, ether compounds, ester compound, nitrile compounds, amide compounds and imide compounds.

39. A method for producing a soft agglomerate of

cuprous oxide ultrafine particles according to any one of claims 35-37, wherein diethylene glycol contains water in an amount of not more than 30 moles based on 1 mole of the copper compound.

In the description

Page 8, line 4 to page 15, line 13 should read as follows.

(1) A soft agglomerate of cuprous oxide ultrafine particles having an average primary particle diameter of not more than 100 nm and an average secondary particle diameter of not less than 0.2 μm.

(2) A soft agglomerate of cuprous oxide ultrafine particles described in (1) having an average primary particle diameter of not more than 25 nm.

(3) A soft agglomerate of cuprous oxide ultrafine particles described in (1) having an average primary particle diameter of not more than 10 nm.

(4) A soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(3) which does not have a surfactant or a bulky organic compound on the particle surface.

(5) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises producing cuprous oxide ultrafine particles and simultaneously therewith forming a soft agglomerate of

the particles by producing cuprous oxide ultrafine particles in a bad dispersion medium.

(6) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises producing cuprous oxide ultrafine particles in a good dispersion medium and then forming a soft agglomerate of the cuprous oxide ultrafine particles by applying an agglomerating force between the cuprous oxide ultrafine particles.

(7) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises producing cuprous oxide ultrafine particles in a good dispersion medium and simultaneously therewith forming a soft agglomerate of the cuprous oxide ultrafine particles by applying an agglomerating force between the cuprous oxide ultrafine particles.

(8) A method for producing a dispersion of cuprous oxide ultrafine particles which comprises a first step of preparing cuprous oxide ultrafine particles having an average primary particle diameter of not more than 100 nm in a first solvent and simultaneously therewith obtaining a soft agglomerate of cuprous oxide ultrafine particles having a secondary particle diameter of not less than 0.2 μm, a second step of separating the soft agglomerate obtained at the first step from the first solvent, and a third step of

redispersing the soft agglomerate separated at the second step in a second solvent to obtain a dispersion of cuprous oxide ultrafine particles.

(9) A method for producing a dispersion of cuprous oxide ultrafine particles described in (8), wherein the dispersion of cuprous oxide ultrafine particles obtained at the third step are in the colloidal state and the cuprous oxide ultrafine particles are suspended in the dispersion.

(10) A method for producing a dispersion of cuprous oxide ultrafine particles described in (9), wherein the cuprous oxide ultrafine particles have an average secondary particle diameter of less than 200 nm in the dispersion of cuprous oxide ultrafine particles which is in the colloidal state.

(11) A method for producing a dispersion of cuprous oxide ultrafine particles described in any one of (8)-(10), wherein the second solvent contains a dispersing agent for the cuprous oxide ultrafine particles.

(12) A method for producing a dispersion of cuprous oxide ultrafine particles described in (11), wherein the dispersing agent is a polyhydric alcohol.

(13) A method for producing a dispersion of cuprous oxide ultrafine particles described in (12), wherein the polyhydric alcohol has a carbon number of not more than 10.

(14) A dispersion of cuprous oxide ultrafine

particles which is obtained by the method of any one of (8)-(13).

(15) A dispersion of cuprous oxide ultrafine particles described in (14) which contains 0.01-50% by weight of a reducing agent capable of reducing the cuprous oxide ultrafine particles in the dispersion.

(16) Cuprous oxide ultrafine particles which have an average primary particle diameter of not more than 100 nm and an average secondary particle diameter of less than 0.2 μm.

(17) Cuprous oxide ultrafine particles described in (15) having an average primary particle diameter of not more than 25 nm.

(18) Cuprous oxide ultrafine particles described in (15) having an average primary particle diameter of not more than 10 nm.

(19) Cuprous oxide ultrafine particles described in any one of (16)-(18) which do not have a surfactant or a bulky organic compound on the surface of the particles.

(20) A method for producing cuprous oxide ultrafine particles described in any one of (16)-(19) which comprises obtaining cuprous oxide ultrafine particles by dispersing the soft agglomerate of cuprous oxide ultrafine particles of any one of (1)-(4).

(21) A colloidal dispersion of cuprous oxide ultrafine particles which contains cuprous oxide ultrafine particles of any one of (16)-(19), the

particles being suspended in the dispersion medium.

(22) A colloidal dispersion of cuprous oxide ultrafine particles described in (21), wherein the total weight of the cuprous oxide ultrafine particles is not less than 10% by weight based on the total weight of the dispersion.

(23) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises reducing a copper carboxyl compound with hydrazine and/or a hydrazine derivative in an amount of 0.4-5.0 moles based on 1 mole of the copper carboxyl compound in an aqueous solution containing not less than 10% by weight of water to produce cuprous oxide ultrafine particles.

(24) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in (23), wherein the solution contains at least one organic compound selected from the group consisting of alcohol compounds, ether compounds, ester compounds and amide compounds.

(25) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in (23) or (24) which further comprises adding a basic compound for reducing the copper carboxyl compound with hydrazine and/or a hydrazine derivative.

(26) A method for producing a soft

agglomerate of cuprous oxide ultrafine particles described in any one of (23)-(25), wherein the copper carboxyl compound is copper acetate.

(27) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (23)-(26), wherein hydrazine and/or a hydrazine derivative are dissolved in the solution at a concentration higher than 20% by weight and the solution is added to the reaction solution.

(28) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises obtaining a colloidal dispersion of cuprous oxide ultrafine particles by heating and reducing at least one copper compound selected from the group consisting of a copper carboxyl compound, a copper alkoxy compound and copper diketonate compound at a temperature of not lower than 160°C in diethylene glycol and forming a soft agglomerate of cuprous oxide ultrafine particles by further heating the colloidal dispersion.

(29) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises obtaining a colloidal dispersion of cuprous oxide ultrafine particles by heating and reducing at least one copper compound selected from the group consisting of a copper carboxyl compound, a copper alkoxy compound and copper diketonate compound at a temperature of not

lower than 160°C in diethylene glycol and then adding an agglomerating agent for cuprous oxide ultrafine particles to the dispersion.

(30) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (1)-(4) which comprises heating and reducing at least one copper compound selected from the group consisting of a copper carboxyl compound, a copper alkoxy compound and copper diketonate compound at a temperature of not lower than 160°C in diethylene glycol and simultaneously adding to the diethylene glycol an agglomerating agent for cuprous oxide ultrafine particles, which is soluble in diethylene glycol at the reaction temperature.

(31) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in (29) or (30), wherein the agglomerating agent is at least one compound selected from the group consisting of monoalcohol compounds, ether compounds, ester compounds, nitrile compounds, amide compounds and imide compounds.

(32) A method for producing a soft agglomerate of cuprous oxide ultrafine particles described in any one of (28)-(30), wherein diethylene glycol contains water in an amount of not more than 30 moles based on 1 mole of the copper compound.